Cable Routing Procedures for Dell™ PowerEdge™ R320 & R420 Systems

This Dell Technical White Paper explains the best practices for routing and securing the cables exiting the back of the R320 & R420 systems.

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Introduction

This white paper covers recommended cable routing procedures for the Dell™ PowerEdge™ R320 & R420 systems in the following racks:

- PowerEdge 2410, 4210
- PowerEdge 2420, 4220, 4820 (including wide and deep versions)
- PowerEdge Energy Smart 4020S, 4620S

If you are using the optional cable management arm (CMA), following these procedures will allow you to extend the system from the rack for service without powering down or disconnecting the cables. If you are not using the CMA, following these procedures will ensure secure attachment and strain relief of the cables behind the system.

For guidelines on how to route cables within the rack, refer to the Dell *Best Practices Guide for Rack Enclosure* white paper. For additional details regarding potential interferences between the CMA and rear-mount power distribution units (PDUs) in Dell racks as well as general information about third party rack compatibility, refer to the *Dell Enterprise Systems Rail Sizing and Rack Compatibility Matrix* located at http://content.dell.com/us/en/enterprise/d/business~solutions~engineering-docs~en/Documents~rail-rack-matrix.pdf.aspx.

Section 1: Cabling a PowerEdge R320 or R420 system with a CMA

This section details how to cable the PowerEdge R320 & R420 systems on sliding rails using a CMA. If you are cabling the system without the optional CMA, refer to Section 3.

Follow the instructions contained in the *Rack Installation Instructions* in the sliding rail kit to install the server into the rack. Once installed, use these instructions to install the cables. All illustrations in the following sections were created using a PowerEdge R320 system.

NOTE: The PowerEdge R320 & R420 systems are backward compatible with the PowerEdge R310 & R410 rails and CMA.

1.1. Connecting the cables to the system

Attach the CMA tray to the back of the rails as described in the *CMA Installation Instructions* provided in the CMA kit. Connect all applicable cables to the rear of the system and verify that all connections are secure. See Figure 1.

Figure 1. System with cables installed



1.2. Routing the power cables through the strain reliefs

After you have installed the tray and cables, route the power cable(s) through the strain relief(s) located on the power supply handle(s) as shown in Figures 2 & 3.

Figure 2. Routing power cables through the strain reliefs on hot swap power supplies



Figure 3. Routing the power cable through the strain relief on a fixed power supply



1.3. Installing the CMA

The CMA can be installed on either the rear right or rear left side of the rails as described in the *CMA Installation Instructions*. Mounting the CMA on the side that is opposite of the power supplies (left-side mount) is recommended for systems with hot swap power supplies; otherwise, the CMA must be partially disconnected in order to remove the outer power supply. Refer to Section 2 for details on power supply replacement.

NOTE: If you are installing fiber-optic cables in the CMA, a cable bend radius of at least 1 inch must be maintained throughout the length of the cable. It is recommended that fiber-optic cables be routed on the exterior of the cable bundle to increase the bend radius of the fiber-optic cables through the CMA. Additionally, a large amount of slack at the entrance and exit of the CMA is recommended.

1.3.1. Installing the inner CMA attachment bracket

As described in the *CMA Installation Instructions*, locate and attach the appropriate inner CMA attachment bracket based on which side you wish to mount the CMA. Use the bracket marked "A" for mounting the CMA on the left side, and the bracket marked "B" for mounting on the right side. See Figure 4.

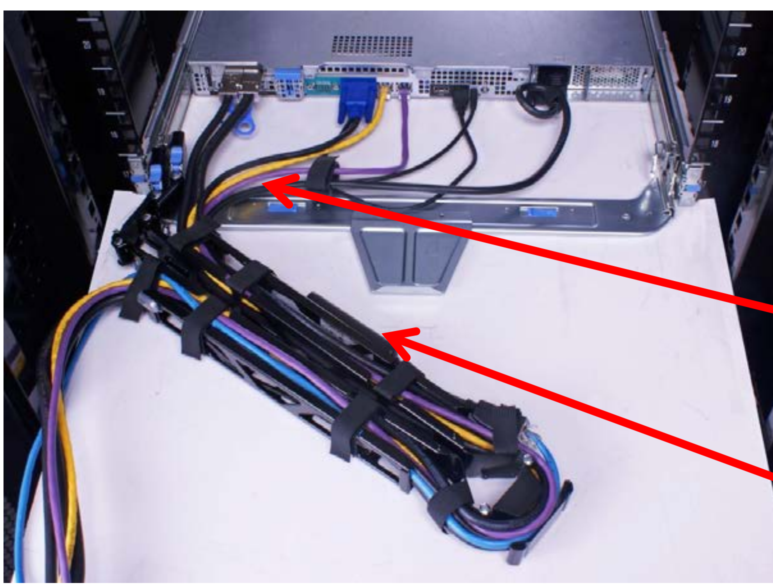
Figure 4. Attaching the inner CMA attachment bracket



1.3.2. Left-side mounting instructions

1. Install the CMA on the rear left side of the rails by attaching both CMA housings to the attachment brackets on the rails.
2. Route the cables through the CMA while avoiding twisting the cables. Use the hook-and-loop straps on the CMA to secure the cables.
3. If the cable bundle includes a keyboard, video, and mouse system interface pod (KVM SIP), it can be placed inside the CMA basket for light to medium cable loads. If the KVM SIP will not fit inside the basket with the other cables, attach it to the exterior of the front basket as shown in Figure 5.

Figure 5. Routing the cables through the CMA



NOTE: Do not store excess cable slack inside the CMA. The cables may protrude through the CMA, thus causing binding and potentially damaging the cables.

Cables entering the CMA should have a small amount of slack to avoid cable strain when the CMA is extended.

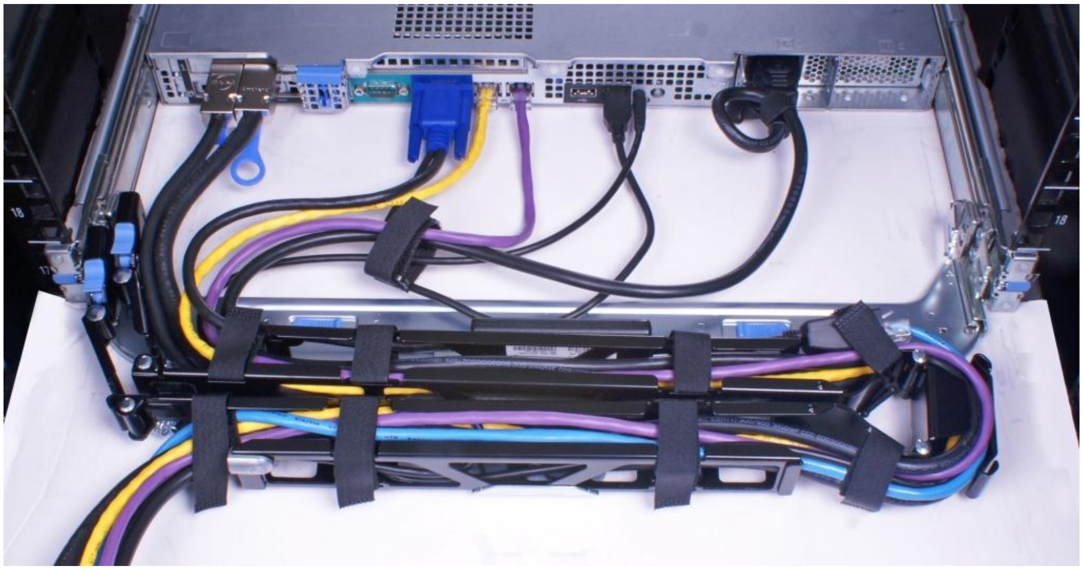
KVM SIP can be attached to the outside of the CMA basket if necessary using the hook-and-loop straps provided on the CMA.

4. Once you have routed all of the cables through the CMA, dress the cable slack between the back of the system and the entrance of the CMA using the tie wraps provided in the CMA kit.
5. Clip off the excess length of material from the tie wraps. Make sure that the heads of the tie wraps are positioned so as to avoid interference with adjacent systems. Return the CMA to the closed (retracted) position.

6. Extend the system out of the rack to verify that there is sufficient slack in the cables on both ends of the CMA.

See Figure 6 for an example of a completed left-side mounted CMA installation.

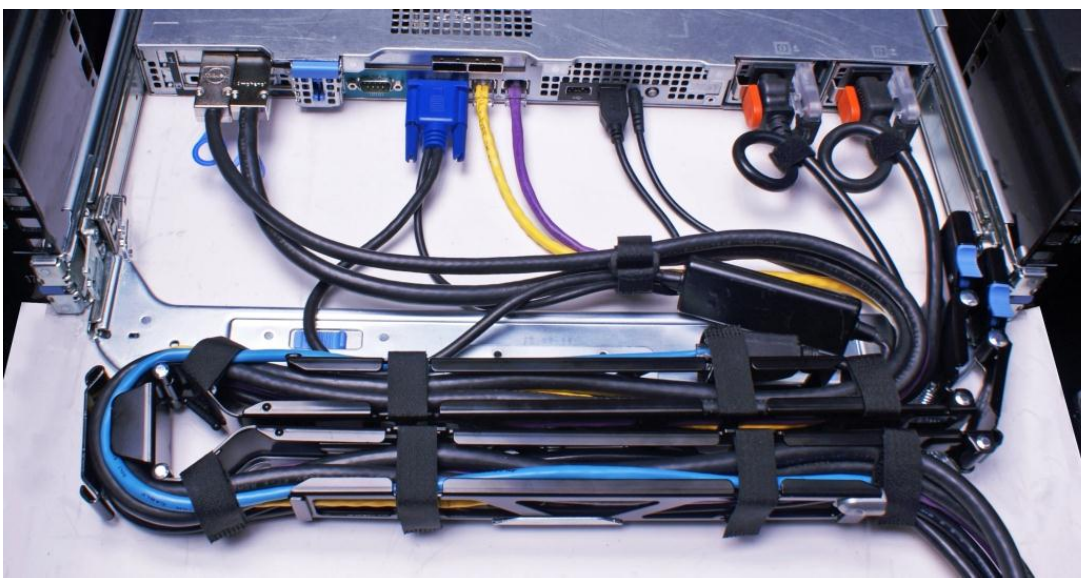
Figure 6. Left-side mounted CMA installation (preferred)



1.3.3. Right-side mounting instructions

Install the CMA on the rear right side of the rails by attaching both CMA housings to the attachment brackets on the rails. The remaining steps are the same as for left-side mounting as described in Section 1.3.2. See Figure 7 for an example of a completed right-side mounted CMA installation.

Figure 7. Right-side mounted CMA installation



Section 2: Replacing a hot swap power supply on a PowerEdge R320 or R420 system with a CMA

2.1. Replacing a hot swap power supply with a left-side mounted CMA

1. Swing the CMA to its service position as described in the *CMA Installation Instructions* provided with the CMA kit.
2. Remove the tray from underneath the CMA as described in the *CMA Installation Instructions*.
3. Disengage the strain relief and disconnect the power cord from the power supply.
4. Replace the power supply.
5. Plug in the power cord, re-engage the strain relief, replace the CMA support tray, and return the CMA to the closed (retracted) position.

2.2. Replacing a hot swap power supply with a right-side mounted CMA

1. If the innermost power supply must be replaced, then follow the steps described in Section 2.1. If the outermost power supply must be replaced, follow the steps described below.
2. Swing the CMA to its service position as described in the *CMA Installation Instructions* provided with the CMA kit.
3. Remove the tray from underneath the CMA as described in the *CMA Installation Instructions*.
4. Disengage the strain relief and disconnect the power cord from the power supply.
5. Disconnect both CMA attachment housings from the brackets on the rails as shown in Figure 8.
6. Detach the inner CMA bracket from the rail by pushing on the end of the lock spring and lifting the bracket up and to the left until it clears the standoffs on the rail.
7. While supporting the CMA with one hand, remove and replace the outer power supply with the other hand as shown in Figure 9.
8. Reinstall the inner CMA bracket to the rail and reconnect the CMA to the brackets.
9. Plug in the power cord, re-engage the strain relief, replace the CMA support tray, and return the CMA to the closed (retracted) position.

Figure 8. Disconnecting the CMA attachment housings

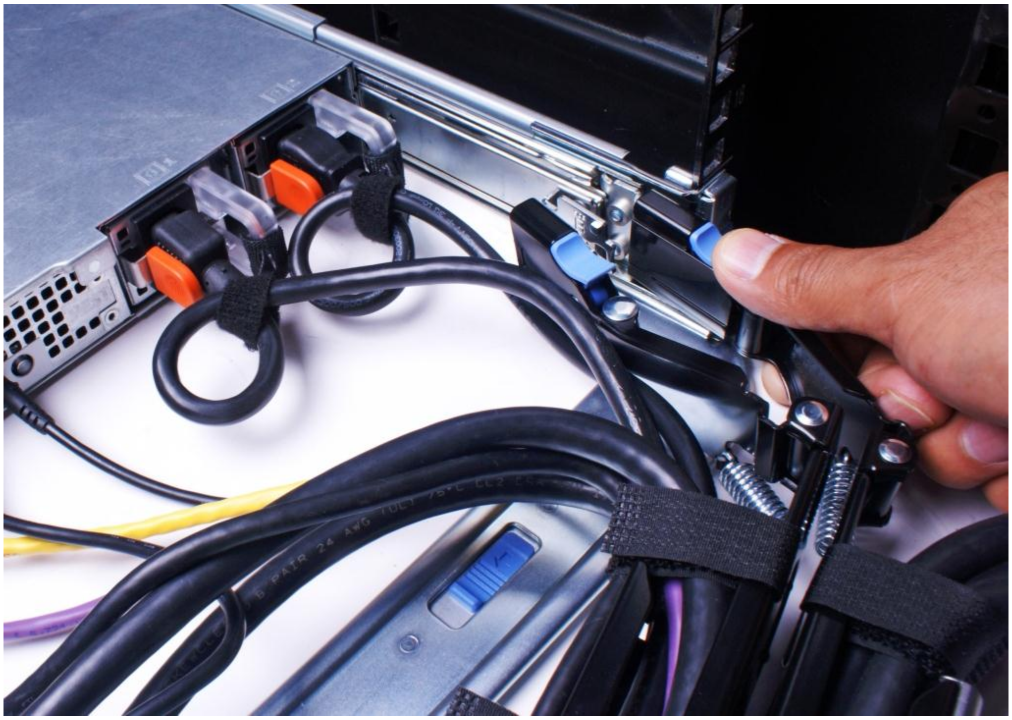


Figure 9. Replacing the outer power supply



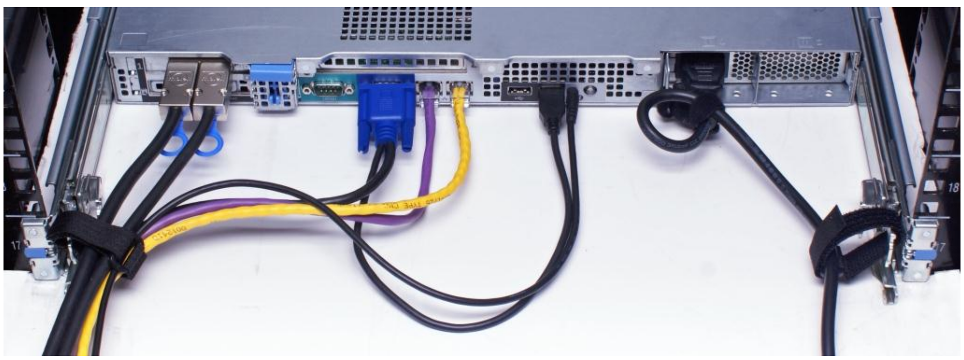
Section 3: Cabling a PowerEdge R320 or R420 system on sliding rails without a CMA

NOTE: The CMA for the Dell PowerEdge R320 & R420 is optional. Without the CMA installed, the system must be powered down and all cables disconnected before it can be extended out of the rack.

3.1. Routing the cables

1. Connect all applicable cables to the rear of the system and verify that all connections are secure.
2. Using the hook-and-loop straps supplied with the rail kit, bundle the cables and secure them to either the left or right outer CMA attachment bracket as described in the *Rack Installation Instructions*. See Figure 10 for an example of data cables secured to the left outer CMA bracket and power cables secured to the right outer CMA bracket (as viewed from the rear of the system).

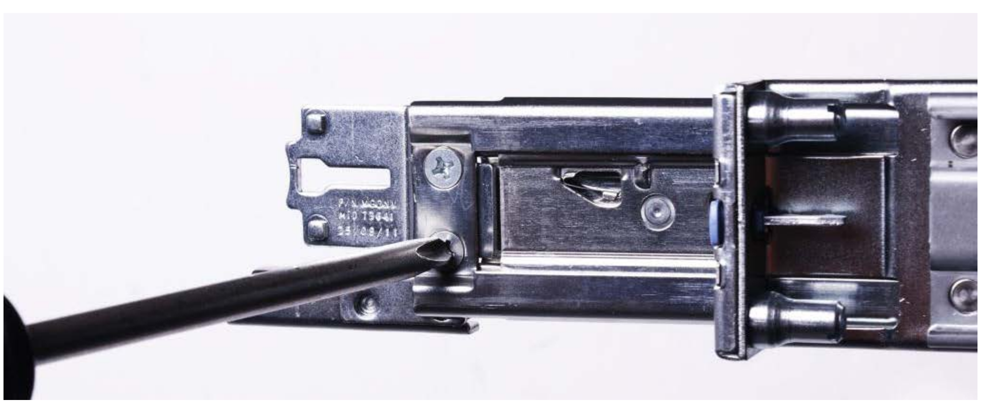
Figure 10. Cable routing on sliding rails without a CMA



3.2. Removing the outer CMA brackets for shallow racks

If you are installing the system into a shallow rack (less than 1 meter deep) and you will not be installing a CMA, the outer CMA brackets may be removed from the sliding rails if necessary in order to allow the rails to fit properly into the rack. Remove the brackets by using a #2 Phillips screwdriver to remove the screws that secure the brackets to the rails as shown in Figure 11. Use the hook-and-loop straps supplied with the rail kit to secure the cables to the rack frame if desired.

Figure 11. Removing the outer CMA brackets for shallow racks



Section 4: Cabling a PowerEdge R320 or R420 system installed on static rails

NOTE: The CMA is compatible only with the sliding rails, not the static rails.

1. Follow the instructions contained in the *Rack Installation Instructions* found in the static rail kit to install the server into a two-post or four-post rack.
2. Install the hook-and-loop straps provided in the rail kit through the slots in the rear brackets of the rails as described in the *Rack Installation Instructions*.
3. Connect all applicable cables to the rear of the system and verify that all connections are secure.
4. Using the hook-and-loop straps, bundle the cables and secure them to either the left rail or right rail as described in the *Rack Installation Instructions*. See Figure 12 for an example of data cables secured to the left rail and power cables secured to the right rail (as viewed from the rear of the system).

Figure 12. Cabling a system installed in static rails

